



IN THE UNITED STATES PATENT AND TRADEMARK OFFICE
BEFORE THE BOARD OF PATENT APPEALS AND INTERFERENCES

Appl. No. : 09/684,173
Appellant : James R. Kittrell
Filed : October 6, 2000
TC/A.U. : 1711
Examiner : T. T. Tran

Confirmation No. 3692

RECEIVED
NOV 25 2003
TC 1700

Docket No. : 00-625
Customer No. : 34704

Commissioner for Patents
P.O. Box 1450
Alexandria, VA 22313

APPEAL BRIEF

Dear Sir:

This is an appeal to the Board of Patent Appeals and Interferences from the final rejection of the Examiner dated April 4, 2003, finally rejecting claims 27 and 28.

REAL PARTY IN INTEREST

The real party in interest is KSE, Inc.

RELATED APPEALS AND INTERFERENCES

There are no other appeals or interferences known to Appellant or Appellant's legal representative which would directly affect or be directly affected by or have a bearing on the Court of Appeals decision in the pending appeal.

STATUS OF CLAIMS

Claims 27 and 28 are the only claims pending in the application. All of the claims stand rejected and are on appeal. A true copy of the claims on appeal are attached hereto as Appendix A.

STATUS OF AMENDMENTS

No amendment was filed subsequent to the final rejection.

SUMMARY OF INVENTION

The present invention relates to a particularly preferred photocatalyst for use in a process for purifying a contaminated gas stream by conversion of the contaminants into less harmful products. The photocatalyst of the present invention is particularly useful in combination with a source of UV radiation. In accordance with the present invention, the photocatalyst comprises 0.1 wt.% to about 70 wt.% silica, from about 30 wt.% to about 90 wt.% titania, from about 10 wt.% to 50 wt.% tungsten oxide, preferably from 20-30 wt.% tungsten oxide, and an element selected from the group consisting platinum, palladium, and mixtures thereof in an amount of between about 0.1 wt.% to about 5.0 wt.% (see Page 19, lines 10-18 of the instant specification). The catalyst of the present invention exhibits high photocatalytic activity for oxidizing contaminants in an incoming air stream to produce oxygenated products (see Page 15, lines 8-12). The catalyst of the present invention exhibits excellent catalytic activity under photocatalytic contact times of less than one second (see Page 14, lines 20-24).

REFERENCES RELIED UPON BY EXAMINER

Patent No.	Patentee	Issue Date
3,640,817	O'Hara	February 8, 1972
6,086,749	Kramer et al.	July 11, 2000

REJECTION OF RECORD

Claims 27 and 28 stand rejected under 35 USC 102(e) as being anticipated by or, in the alternative, under 35 USC 103(a) as being obvious over U.S. Patent 6,086,749.

Claims 27 and 28 are further rejected under 35 USC 102(b) as being anticipated by or, in the alternative, under 35 USC 103(a) as being obvious over U.S. Patent 3,640,817.

These are the sole rejections on appeal.

ISSUES

- (1) Whether U.S. Patent 6,086,749 either anticipates and/or renders obvious the invention as claimed; and
- (2) Whether U.S. Patent 3,640,817 anticipates and/or renders obvious the invention as claimed.

GROUPING OF CLAIMS

Claims 27 and 28 are each separately patentable for the reasons set forth in the Argument section of this appeal brief.

ARGUMENT

(A) THE REJECTION UNDER 35 USC 102(e) AND UNDER 35 USC 103(a) BASED ON U.S. PATENT 6,086,749 IS IMPROPER. INDEPENDENT CLAIM 27 SETS FORTH A CATALYST WHICH COMPRISES THE FOLLOWING:

- (1) from about 0.1 wt.% to about 70 wt.% silica;
- (2) from about 30 wt.% to about 90 wt.% titania;
- (3) from about 10 wt.% to 50 wt.% tungsten oxide; and
- (4) an element selected from the group consisting of platinum, palladium, and mixtures thereof in an amount of between about 0.1 wt.% to about 5.0 wt.%.

The Examiner in rejecting claim 27 under 35 USC 102(e) or 35 USC 103(a) based on the '749 patent sets forth the following:

"Kramer teaches a catalyst composite, comprising a combination of silica, titania, tungsten oxide, and platinum (see col. 37, ln. 2-20). Kramer further teaches tungsten oxide (Group VIB metal) to be about 0.5 to about 50% by weight; platinum (Group VIII metal) about 0.1 to about 10% by weight; and that the total metal components would be about 0.1 to about 60% by weight of the total catalyst (see col. 37, ln. 32-51), overlapping the instantly claimed ranges. Thus, the total weight of silica and titania would inherently be about 40 to about 99.1%, overlapping the instantly claimed ranges.

Although Kramer is silent with respect to the weight percent of silica and titania separately, the weight percent of silica and titania each would be inherently overlapping the instantly claimed ranges, because the

silica weight is presently claimed to be about 0.1% to about 70% whereas the titania weight about 30% to about 90%.

Therefore, the subject matter as a whole would have been obvious to one of ordinary skill in the art, at the time the invention was made, to have selected the overlapping portion as taught by Kramer, because overlapping ranges have been held to be a *prima facie* case of obviousness. See *MPEP 2144.05*."

Initially it should be pointed out with respect to the claimed invention that claim 27 requires silica, titania, tungsten oxide, and at least one of platinum and palladium. Secondly, independent claim 27 requires that each of the above be present in the specific weight percent amounts. With respect to the first point, it should be noted that a fair reading of the '749 patent does not suggest, anticipate or render obvious the combination of the catalyst composition as claimed. The portion of the specification referred to by the Examiner, namely, column 37, lines 2-20, contrary to the Examiner's contention, does not teach the catalyst composition as claimed in independent claim 27. This combination can only be gleaned by the Examiner from a hindsight reconstruction based on Appellant's instant disclosure and claimed invention. In this regard it is noted that a fair reading of column 37, lines 2-20 suggests an inorganic support of silica or titania individually and not in combination as claimed in independent claim 27. The '749 patent does disclose specific combinations of inorganic oxides which are suitable in the catalyst disclosed in the '749 patent. In this regard attention is drawn to column 37, lines 19 and 20 of the '749 patent. This portion clearly identifies the compositions of the inorganic oxide as silica-alumina, silica-magnesia, and alumina-magnesia. The disclosed combinations of inorganic oxides which are suitable in the invention of the '749 patent do not include silica and titania. Accordingly, if anything, a fair reading of the '749 patent teaches away from the combination of silica and titania and thus, in accordance with the teachings of the '749 patent, the combination of silica and titania would be unobvious.

It is respectfully submitted that the foregoing alone clearly distinguishes the claimed invention over the teachings of the '749 patent; however, it is further

urged that the '749 patent does not suggest or anticipate the composition of the catalyst as specifically claimed in independent claim 27. Claim 27 requires a specific amount of silica and titania in the catalyst composition. Specifically, titania is required in a weight percent of between 30 wt.% to about 90 wt.%. There is absolutely no teaching or suggestion of a titania content in the weight percent set forth above in combination with silica. As noted above, the combination of silica and titania per se is not anticipated nor rendered obvious by the '749 patent. In addition, it clearly is out of the realm of the teaching of the '749 patent to have a titania content of 30 wt.% to 90 wt.% in combination with silica as claimed for the catalyst of independent claim 27. Accordingly, it is respectfully submitted that the Examiner's rejection of independent claim 27 based on the '749 patent under either 35 USC 102(e) or 35 USC 103(a) is improper and should be reversed.

(B) THE REJECTION UNDER 35 USC 102(b) AND 35 USC 103 (a) OVER U.S. PATENT 3,640,817 IS IMPROPER. IN REJECTING CLAIM 27 OVER THE '817 PATENT THE EXAMINER SETS FORTH THE FOLLOWING:

"O'Hara teaches a catalyst composite, comprising a mixture of metallic components from Groups VIB and VIII, such as tungsten and platinum, combined with a porous carrier material containing a mixture of silica and titania (see col. 2, ln. 44-59). O'Hara further teaches the porous carrier material containing about 10.0% to about 90.0% weight of silica (see col. 2, ln. 63-66); the catalyst composite containing about 4.0% to about 30.0% of tungsten and about 1.0% to about 10.0% of platinum (Group VIII)(see col. 3, ln. 35-44).

Thus, the amount of silica and titania would inherently be about 60 to about 96%, in which there are about 10.0 to about 90.0% weight of silica and about 10.0 to about 90.0% weight of titania, which reads upon the instantly claimed ranges of silica and titania.

With respect to the platinum component, O'Hara teaches the catalyst comprising about 1 to about 10% of platinum (see col. 5, ln. 46-47), overlapping the instantly claimed range. Therefore, the subject matter as a whole would have been obvious to one of ordinary skill in the art, at the time the invention was made, to have selected the overlapping portion as taught by O'Hara, because overlapping ranges have been held to be a *prima facie* case of obviousness. See *MPEP 2144.05*."

As noted above, the '817 composition set forth in column 2, lines 49-50 represents a composite comprising one or more metallic components including tungsten. It is quite clear from a reading of the '817 document that it refers to catalytically active metallic components. This is contrary to the claimed invention in independent claim 27 which does not use metallic tungsten but rather tungsten oxide.

Tungsten oxide is not a metal. Tungsten is not a metallic component. The teaching of the '817 patent comprises metallic tungsten and not tungsten oxide. When one reads the '817 patent in its entirety, one sees that the catalyst of the '817 patent is used only in the fully reduced state, in a hydrogen atmosphere. Thus, the '817 patent clearly demonstrates that metallic tungsten is used on the catalyst.

As noted above, the tungsten oxide component claimed in the present invention is not a metallic component as taught by the '817 patent. The scientific literature clearly distinguishes between a metal and an oxide. Reference is made to the book entitled "CHEMISTRY" by Michell J. Sienko and Robert A. Plane, McGraw Hill, New York, 1957, Page 412. These authors clearly distinguish between the metal and the oxide of that metal. They state "The element tungsten...occurs in nature principally as the tungstates...In order to get the metal, tungstates are treated with acid to precipitate insoluble tungstic acid, which is dehydrated by ignition to tungstic oxide...Hydrogen reduction production of WO_3 produces W." The interpretation is unmistakable. In order to get the metal, tungstates must be treated with acid and reduced with hydrogen. The metallic components which are described by O'Hara (of which his catalyst is comprised) are not synonymous with oxides of these metals. O'Hara describes catalysts comprised of metals, not catalysts comprised of tungsten oxide.

It should be noted that the catalyst of the present invention as claimed could not even exist under the conditions disclosed in the '817 patent. Under the conditions of the '817 patent, the tungsten oxide component of the catalyst of the present invention would be reduced to a metallic state. The catalyst of the present invention requires tungsten oxide as a component and not metallic tungsten.

It is respectfully submitted that the Examiner has misinterpreted the '817 patent. The '817 patent is limited to metallic components. The '817 patent further states that these components have to be catalytically active metallic components. Thus, clearly, as noted above, tungsten oxide is not taught or rendered obvious by the '817 patent. Applicant attaches hereto as Appendix B the title page and Page 412 of the book entitled CHEMISTRY noted above.

In light of the foregoing, it is submitted that the rejection of claim 27 over the '817 patent under either 35 USC 102(b) or 35 USC 103(a) should be reversed.

(C) NEITHER U.S. PATENT 6,086,749 NOR U.S. PATENT 3,640,817
ANTICIPATE OR RENDER OBVIOUS THE COMPOSITION OF
DEPENDENT CLAIM 28.

Dependent claim 28 sets forth a tungsten oxide composition of between about 20 wt.% to about 30 wt.%. As noted above with regard to the '817 patent, the '817 patent does not teach or suggest a catalyst which includes tungsten oxide. Rather, the '817 patent teaches metallic tungsten which, as noted above, is totally different from Tungsten oxide as claimed in the catalyst of the instant invention. Accordingly, as the '817 patent does not suggest tungsten oxide, it cannot suggest the critical tungsten oxide composition as set forth in dependent claim 28.

The 6,086,749 patent is likewise defective. As noted above, a fair reading of the '749 patent cannot be said to teach, disclose or render obvious the combination of silica and titania in a catalyst composition. Be that as it may, clearly, there is no suggestion or teaching in the '749 patent of a catalyst composition as claimed in dependent claim 28 which comprises silica and titania wherein titania is in the specified amount of 20-30 wt.%. Accordingly, it is respectfully submitted that the Examiner's rejection of claim 28 is improper and should be reversed.

CONCLUSION

For the reasons set forth above, the Board of Appeals is respectfully requested to reverse the Examiner's rejection of claims 27 and 28.

APPEAL BRIEF FEE

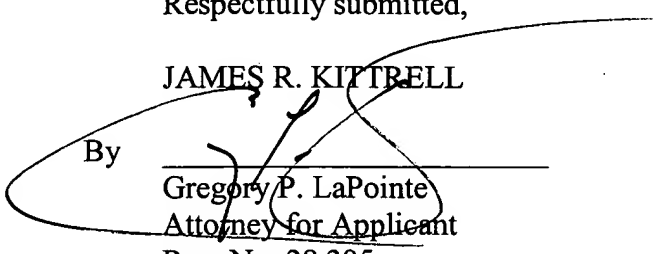
A check in the amount of \$1,570.00 is enclosed to cover the Appeal Brief fee, The request for oral hearing fee and the extension of time fee.

If any additional fees are required in connection with this case, it is respectfully requested that they be charged to Deposit Account No. 02-0184.

Respectfully submitted,

JAMES R. KITTBELL

By

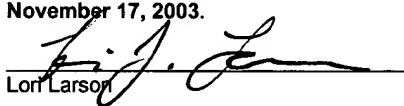


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IN TRIPLICATE

Date: November 17, 2003

I hereby certify that this correspondence is being deposited with the United States Postal Service with sufficient postage as first class mail in an envelope addressed to: "Commissioner for Patents, P.O. Box 1450, Alexandria, VA 22313" on November 17, 2003.



Lori Larson

APPENDIX A

27. A catalyst for converting contaminants in a gas stream comprises from about 0.1 wt.% to about 70 wt.% silica, from about 30 wt.% to about 90 wt.% titania, from about 10 wt.% to about 50 wt.% tungsten oxide and an element selected from the group consisting of platinum, palladium and mixtures thereof in an amount of between about 0.01 wt.% to about 5.0 wt.%.

28. A catalyst according to claim 27, wherein said tungsten oxide is present in an amount of between about 20 wt.% to about 30 wt.%.

Appendix B

CHEMISTRY. Copyright © 1957 by the McGraw-Hill Book Company, Inc. Printed in the United States of America. All rights reserved. This book, or parts thereof, may not be reproduced in any form without permission of the publishers.
Library of Congress Catalog Card Number 56-13404

II

The text of this book is set in Monotype Bodoni, a typeface based on those designed by Giambattista Bodoni of Parma in the late eighteenth century. The chapter headings are set in Franklin Gothic Wide. The drawings are by Felix Cooper.



This book is a chemistry course at the University of Agriculture, and Sciences, and have had no previous high-school knowledge or more addition get no further for verse groups, we sometimes at the course. We feel efficient principles and other reference what his future course.

The book consists of establishing the foundation of development and the description of the descriptive

as it is sometimes called, chromic anhydride. It is a very powerful oxidizing agent and is used extensively in preparing organic compounds (see Chap. 24). Solutions of CrO_3 in concentrated H_2SO_4 are used as "cleaning solution" for glass equipment in laboratories. The cleaning action is due to the oxidation of grease.

2. *Molybdenum*. Molybdenum is found in nature as the mineral molybdenite, MoS_2 , a beautiful blue-gray material of metallic luster, frequently confused with graphite. When heated in air, MoS_2 is oxidized to the trioxide, MoO_3 , which is then reduced to the metal by heating with hydrogen. Because of its very high melting point ($2620^\circ\text{C}.$), Mo is obtained as a powder. This is pressed into bars and heated, so as to sinter the particles together to give sheet or wire for use as supports in X-ray tubes, electron tubes, electric furnaces, etc., where high temperatures may develop locally.

The major part of the Mo metal produced goes into iron alloys, where it acts as a toughening agent, favoring fine-grained structure. The molybdenum is added as ferromolybdenum (55 to 75 per cent Mo in Fe), made by reducing mixed oxides of Mo and Fe.

The most important oxidation state of molybdenum is +6, as, for example, in molybdenum trioxide, MoO_3 . This trioxide is acidic and dissolves in basic solutions to form a complicated series of oxyanions called the molybdates, the simplest of which is MoO_4^{--} . More complicated molybdates, having Mo-O-Mo bridges and containing up to 24 Mo atoms per ion, are known. These are called polymolybdates but are not well characterized. Neither MoO_3 nor the molybdates are particularly good oxidizing agents. When reduced, MoO_3 can form a deep blue oxide of variable composition $\text{MoO}_{2.5-3.0}$, which is apparently some sort of defect structure (Sec. 8.5). Further reduction of MoO_3 or the molybdates usually forms the metal, but under appropriate conditions Mo^{+3} can be formed in aqueous solution. Its properties have not been well determined.

3. *Tungsten*. The element tungsten is frequently also called wolfram, whence the symbol W. It occurs in nature principally as the tungstates, e.g., as a calcium tungstate, CaWO_4 , or scheelite, and as a mixture of iron and manganese tungstates, $(\text{Fe}, \text{Mn})\text{WO}_4$, or wolframite. In order to get the metal, tungstates are treated with acid to precipitate insoluble tungstic acid, H_2WO_4 , which is then dehydrated by ignition to tungstic oxide, WO_3 . Hydrogen reduction of WO_3 produces W.

Since W has such a high melting point,* it, like Mo, is obtained as a fine powder, which is sintered into workable form. Fine tungsten wire for

* At room temperature, tungsten has an extremely small vapor pressure. It has been calculated to correspond to one W atom per universe.

§ 20.7 *Manganese*

lamp filaments can be subjected to the special machine (a machine small). Finally, at high temperature, at

The metal is rather resistant to sulfuric and nitric acid. It is attacked by concentrated HNO_3 and H_2SO_4 to make "high-speed" steels. It has the ability to hold hard. It is used for the tip of off of small particles.

In its compounds
The oxide WO_3 is a
oxides to form tung
tungstates are not p

20.7 MANGANES

The elements of the
tium ($Z = 43$), an
important of the g
nature; rhenium is
the properties of th

1. *Manganese.*

0.08 per cent), but more so than sulfur or pyrolusite, Mn_2

Table